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THE OPERATIVE TREATMENT
OF
HERNIA IN CHILDREN

WITH A REPORT OF FIFTY-ONE CASES

BY
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ASSISTANT SURGEON TO HERNIA DEPARTMENT OF THE HOSPITAL FOR RUP-
TURED AND CRIPPLED; SURGEON TO THE NEW YORK CANCER HOSPITAL

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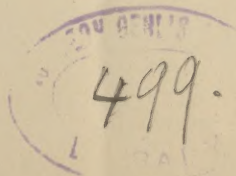
By WILLIAM B. COLEY, M.D.,

ASSISTANT SURGEON TO HERNIA DEPARTMENT OF THE HOSPITAL FOR RUPTURED AND CRIPPLED; SURGEON TO THE NEW YORK CANCER HOSPITAL.

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DURING the past two years 2,174 new cases of hernia, occurring in children under the age of fourteen years, were treated at the Hospital for Ruptured and Crippled. In addition to these cases, a much larger number, recorded in preceding years, yet returning for further observation and treatment, were seen. As the great majority of these cases were treated by mechanical means, and hence have but an indirect bearing upon the subject of this paper, they will be referred to only in the briefest way.

In looking back over the various operations devised for the cure of hernia during the last decade, we are struck with two main facts which go far toward explaining the present attitude of many of the profession in regard to operative procedures. This attitude may be characterized as one of doubt, or at least of very limited faith, and the two facts that have been referred to as explaining it are, first, the too indiscriminate application of imperfect methods; second, the tendency to expect uniformly perfect and lasting results, and falling short of these, to consider all such operations failures. There is really no reason why the operation for the cure or relief of hernia should be judged by a standard entirely different from that adopted in deciding the merits or defects of other operations. Few, if any, are so successful that failures do not sometimes occur, and it seems to me that operations for the cure of hernia should stand or fall according as they fulfil these two conditions of all operations (except emergency): First, a mortality either *nil*, or not greater than that associated with the condition prior to operation. Second, a reasonable hope of success, either in the shape of cure or of relief. Furthermore, there is a tendency to estimate the value of the operation from the results of



the older and less perfect methods, without recognizing the great advances made during the past four years.

Time will not permit me to review or criticise the various methods that have been, and still are, employed to cure hernia by operation, and even if it did, the object of this paper would be better accomplished by confining myself chiefly to personal and clinical observations.

I shall assume that the majority of physicians and surgeons admit, under certain conditions, the advisability of operating upon hernia in adults, however they may differ as to the extent and limitations of such conditions.

The question of applying the same operative procedures to children cannot be disposed of so easily, for the reason that up to very recently we have had insufficient data for the drawing of any conclusions of value.

Indications and Contra-indications for Operation.—

The indications for operation may be classed as follows:

1. Cases of adherent omentum.
2. Cases complicated with reducible hydrocele.
3. Cases irreducible and strangulated.
4. Cases unable to obtain the care and attention requisite for successful mechanical treatment.
5. Cases where mechanical treatment has been faithfully tried for a number of years without benefit.

These five classes seem to me to embrace all hernia in children to which operative measures should be extended. It now remains to look at these indications more closely, and then we shall examine the contra-indications in the light of clinical experience, in order that we may judge how far they obtain.

Adherent Omentum.—This condition, though much less frequent in children, is occasionally met with, and when present interferes materially with mechanical treatment.

Reducible Hydrocele Associated with Hernia.—This is not a very rare complication, and after repeated and persistent attempts to treat such cases by means of a truss, I am convinced that operation is the only proper method of treatment.

Irreducible and Strangulated Hernia.—In strangulated hernia nearly all will admit the advisability of operation, after taxis, under anæsthesia, has failed to give relief. The operation, if done early, is not dangerous, while the delay necessary to the carrying out of any other method of treatment is not infrequently responsible for the fatal results.

Among the poorer classes seen at a dispensary clinic there are a number of cases without parents or anyone sufficiently interested or intelligent to give the necessary attention to a truss; and these cases I believe to be proper subjects for operation, mechanical treatment having been thoroughly tried.

The supposed contra-indications are: 1. The general belief that all cases of hernia in children can be cured without operation, a belief that is not supported by facts, as shown by a careful analysis of 600 cases under the age of ten years treated at the Hospital for Ruptured and Crippled. 2. The belief that strangulated hernia almost never occurs in children, and hence the condition is not dangerous. Strangulation, though infrequent, does occur, four cases having been seen at the hospital during the past year. The third and chief objection is that operation is attended with greater risk in children, and that the final results are less satisfactory.

Karewski, of Berlin, has recently collected and tabulated 81 cases of operation for hernia in children under five years of age. Of these, 74 were reducible and 7 strangulated. There were 5 deaths, of which 4 occurred in strangulated cases, and the fifth was the result of shock from prolonged operation, in a child two years of age. The mortality, then, in the 74 non strangulated cases was 1.3 per cent.

As to wound healing and final results, we find that 39 cases were well and free from relapse one year and longer after operation, while 7 relapses were noted. Suppuration occurred in thirty-three per cent. of the cases; yet when we consider the number of different operators represented, together with the fact that the operations date back for a period of ten years or more, the wound-healing is seen to be quite as good as in adult cases under similar conditions. In fact, the results are better than those obtained in Billroth's Klinik—136 cases, reported by Haidenhain¹ in 1890—in which suppuration occurred in fifty per cent. and relapse in thirty per cent. To these 81 cases collected by Karewski I have added 169 new cases where operation has been performed under the age of fourteen, making a total of 250.

Of these 250 cases—

	Cases.	Relapses.	Deaths.
Bassini operated upon.....	36	1	0
Poor (of New York)	24	1	0
Bayer	11	0	0
Manley	7	1	0
Karewski (own cases)	9	0	0
Karewski (collected cases exclusive of Bassini's)	50	6	1
Championnière.....	18	0	0
Halstead.....	28	2	0
Bull, W. T.....	21	8	1
Coley.....	46	2	0
	250	21	2

¹ Archiv. f. klin. Chirug., 1890.

Thus we find in 250 non-strangulated cases but two deaths, or a mortality of $\frac{2}{250}$ of one per cent., or less than the lowest mortality of any adult statistics. But nineteen relapses, or 8.6 per cent., were observed. The two deaths that occurred were both in cases under two years of age, and both were irreducible and complicated with extensive adhesions, necessitating a prolonged operation.

Personal Observations.—During the past fifteen months at the Hospital for Ruptured and Crippled I have operated upon 46 cases of hernia in children, 42 of which were non-strangulated and between the ages of four and fourteen years. The 4 strangulated cases were aged eight weeks, eight months, seven and one-half months and one year, respectively. There has been no mortality in the non-strangulated cases although many were difficult and complicated, and but a single death in the strangulated cases, that of a baby, eight weeks old. The hernia was of the cæcal variety, and there had been acute strangulation with constant vomiting for upward of twelve hours, and the infant was practically in collapse when first seen. It revived after the operation and lived three days.

Wound Healing.—Absolute primary union occurred in 44 of the 46 cases, and the suppuration in the 2 remaining was due to the use of silk instead of animal suture. Nearly all of the cases were up and about the wards at the end of two and a half weeks. The eight months' baby that was operated upon for strangulation left the hospital at the end of one week, union by first intention having occurred.

Method of Operation.—The Czerny Risel method was employed in a few of the earlier cases, but the great majority, thirty-two in number, were operated upon by the Bassini method, kangaroo tendon being used for the buried sutures. This method has given by far the most satisfactory results, and when once familiar with its technique it is not difficult to perform.

Upon the choice of suture material, next to the choice of method, depends, I believe, the success or failure of the operation. Silk is regarded by many as the best kind of suture, but the majority of surgeons, in spite of every precaution, have been unable to bury it in the hernial canal without causing subsequent trouble. In Billroth's 136 cases (Czerny method) silk was used instead of catgut, and in 77 cases followed up 38, or fifty per cent., suppurated. It was repeatedly tried at the New York Hospital with the same results, and in the only 2 cases of suppuration which occurred in my 46 cases, the result was due to the silk suture. I do not deny that it can be used without producing sinuses and interfering with primary wound-healing in some cases, but I believe that the

Operations for Hernia in Children, by W. B. Coley.

No.	Diagnosis.	Sex.	Age.	Nature of hernia, and history.	Duration.	Truss.	Date of operation.	Operation.	Operator.	Results.
1	Incarcerated omental with effusion.	M.	8 yrs.	Right inguinal; size of egg.	Congenital.	Yes.	Dec. 12, 1891.	Czerny operation. Hydrocele of cord in addition to hernial sac; small bit of incarcerated omentum; no drainage.	W. B. Coley.	Primary union, 3 weeks; no recurrence, 6 months.
2	Large oblique inguinal hernia; reducible.	M.	13 yrs.	Size, orange; right; not held by truss.	3 years.	Yes.	Dec. 28, 1891.	Bassini operation. Silk suture; no drainage.	"	Suppuration; silk ligature came away, 5 weeks; recurrence, 5 weeks.
3	Reducible; inguinal oblique.	M.	6 yrs.	Egg; portion not reducible.	2 years.	Yes.	Jan., 1892....	Czerny. Hydrocele of cord sac found alongside of true hernial sac; no drainage.	"	Primary union; no recurrence, 1 year.
4	Reducible; inguinal oblique.	M.	8 yrs.	Small egg; not held with truss; left.	Congenital.	Yes.	Jan., 1892....	Czerny. Hydrocele of cord sac with true hernial sac; drainage.	W. T. Bull.	Slight suppuration; no recurrence, 1 year.
5	Inguinal; reducible; oblique.	M.	9 yrs.	Small egg; not held; right.	4 years.	Yes.	Jan., 1892....	Czerny. No drainage; silk sutures.	W. B. Coley.	Primary union; sinus soon formed, and silk sutures came away, 3 months; truss could not be worn, and slight recurrence, 3 months; Bassini's operation; well, 2 year later. Primary union; no recurrence, 1 year.
6	Inguinal; reducible; oblique.	M.	13 yrs.	Egg; not held.....	11 yrs.; probably congenital.	Yes.	Jan., 1892....	Czerny. No drainage; chromicized catgut for canal; acquired sac and new genital.	"	Primary union; no recurrence, 1 year.
7	Inguinal; reducible; oblique.	M.	10 yrs.	Small egg; left; not held.	3 years.	Yes.	Feb., 1892....	Czerny. Small sac of old hydrocele of cord; chromic acid catgut; no drainage.	"	Primary union; sound, 1 year.
8	Irreducible; adherent omental.	M.	7 yrs.	Small egg; not held.....	3 years.	Yes.	March, 1892..	Bassini. Large mass of adherent omentum removed; chromicized catgut; no drainage.	"	Primary union; sound, 11 months.
9	{ Very large double inguinal; reducible.	M.	7½ yrs.	Left, orange; right, egg; not held.	4 years.	Yes.	April, 1892....	Czerny. Both sides; one chromicized catgut, one operation; no drainage.	"	Primary union; sound, 11 months.
10	{ Left inguinal.	M.	7 yrs.	Inguinal; cured by truss; recurred; egg removed; 6 mos. none held; almond.	3 years.	Yes.	April, 1892....	Bassini. Operation for inguinal; purse-string suture to crural canal; femoral; kangaroo tendon suture.*	"	Primary union, both sides, 3½ weeks; sound, 1 month.
11	{ Left femoral.	M.	13 yrs.	Wore truss several years; not held; goose egg.	11 years.	Yes.	May 5, 1892..	Bassini operation. Very large sac, adhering to two fingers; small bit of adherent omentum at neck of sac; kangaroo tendon suture.	W. B. Coley.	Primary union; sound, 10 months.
12	Large inguinal; reducible; oblique.	M.	7½ yrs.	Right; small egg.....	Several years.	No.	June 6, 1892..	Bassini operation. Kangaroo tendon; sac adherent to testis; tunica vaginalis opened; sutured with catgut; sac removed; omentum excised.	"	Primary union; well, 1 year.
13	Inguinal; reducible.	M.	4½ yrs.	Truss; not effective.....	2 years.	Yes.	June 14, 1892.	Bassini operation. Kangaroo tendon.	"	Primary union; well, 9 months after.
14	Right inguinal; reducible; inguinal.	M.	4 yrs.	Truss; painful.....	3 mos.	Yes.	June 21, 1892.	Bassini. Tendon suture.....	"	Primary union; perfectly firm 1 year after.
15	Right inguinal; reducible; inguinal.	M.	8 mos.	Strangulated.....	Congenital.	Yes.	July 8, 1892..	Czerny. Catgut suture.....	"	Primary union; well 9 months after.
16	Right inguinal; reducible; inguinal.	M.	10 yrs.	Reducible.....	Congenital.	Yes.	July, 1892....	Bassini. Kangaroo tendon..	Charles W. Wilson, House Surgeon.	Primary union; sound, 9 months.
17	Left inguinal.....	M.	14 yrs.	Goose egg.....	Congenital.	Yes.	July, 26, 1892.	Bassini. Kangaroo tendon; portion of sac left and sutured over testis.	W. B. Coley.	Primary union; sound, 9 months.
18	Right inguinal.....	M.	10 yrs.	Reducible; size, fist.....	Congenital.	Yes.	July, 26, 1892.	Bassini. Complicated with reducible hydrocele; half pint fluid withdrawn from sac and abdomen.	"	Primary union; sound, 9 months.
19	Left oblique.....	M.	14 yrs.	Reducible; egg.....	1½ year.	Yes.	Aug. 23, 1892.	Bassini. Kangaroo tendon..	"	Primary union; sound, 7 months.
20	Left oblique.....	M.	12 yrs.	Reducible.....	6 years.	Yes.	Aug., 1892...	Bassini. Kangaroo tendon..	"	Primary union; sound, 7 months.
21	Left oblique.....	M.	4 yrs.	Reducible; uncomplicated.	Congenital.	Yes.	Sept. 13, 1892.	Sac sutured and deep kangaroo tendon suture to canal as in Bassini; cord not changed.	"	Primary union; sound, 6 months.
22	Right oblique.....	M.	11 yrs.	Reducible.....	Congenital.	Yes.	Sept., 1892....	Bassini. Kangaroo.....	"	Primary union; sound, 6 months.
23	Right oblique.....	M.	6 yrs.	Reducible; hydrocele; complicated.	Congenital.	Yes.	Oct., 1892....	Bassini. Kangaroo tendon..	"	Primary union; sound, 6 months.
24	Right oblique.....	M.	14 yrs.	Egg; congenital; cured by truss; relapsed 6 months ago.	Congenital.	Yes.	Oct. 29, 1892.	Bassini. Kangaroo tendon; no drainage.	"	Primary union; well, 4 months.
25	Left oblique.....	M.	12 yrs.	Orange; ring admitted two fingers.	Congenital.	Yes.	Nov. 1, 1892...	Bassini. Suture of sac; kangaroo tendon; omentum very troublesome; no drainage.	"	Primary union; sound, 4 months.
26	Right oblique.....	M.	4 yrs.	Small hen's egg; not held by truss.	Congenital.	Yes.	Nov. 4, 1892...	Bassini. Kangaroo tendon; lower portion of sac sutured over testis; no drainage.	"	Primary union; well, 4 months.
27	Right oblique.....	M.	11 yrs.	Egg; not held by truss.	Congenital.	Yes.	Nov. 29, 1892.	Bassini. Kangaroo tendon; no drainage.	"	Primary union; sound, 4 months.
28	Right oblique.....	M.	4 yrs.	Orange; not controlled with truss; complicated with disease of and incontinence of rectum.	2 years; acquired.	Yes.	Dec. 26, 1892.	Bassini. Kangaroo tendon; no drainage.	"	Primary union; sound, 3 months.
29	Right oblique.....	M.	8 yrs.	Complicated with undescended testis.	Congenital.	Yes.	Jan. 13, 1893.	Bassini. Kangaroo tendon; testis anchored in scrotum; no drainage.	"	Primary union; sound, 3 months.
30	Right oblique.....	M.	6 yrs.	Size of hen's egg; complicated with reducible hydrocele.	Several years.	Yes.	Jan. 20, 1893.	Bassini. Kangaroo tendon; no drainage.	"	Primary union; sound, 2 months.
31	Left oblique.....	M.	9 yrs.	Size of hen's egg.....	4 years.	Yes.	Jan. 24, 1893.	Bassini. Kangaroo tendon; no drainage.	"	Primary union; sound, 2 months.
32	Left oblique.....	M.	14 yrs.	Size of hen's egg.....	2 years.	Yes.	Jan. 27, 1893.	Bassini. Kangaroo tendon; no drainage.	"	Primary union; sound, 2 months.
33	Left oblique.....	M.	7 yrs.	Size of hen's egg.....	2 years.	Yes.	Feb., 1893...	Bassini. Kangaroo tendon; no drainage.	"	Primary union; sound, 2 months.
34	Left oblique.....	M.	1 year.	Size of goose egg.....	Few months.	No.	Feb. 24, 1893.	Bassini. Kangaroo tendon; no drainage; temperature 107° F. next day: cold baths treatment; recovery.	"	Primary union; left hospital end of 1 week; sound at present, June, 1893.
35	Right oblique with undescended testis.	M.	13 yrs.	Size of hen's egg.....	Congenital.	Yes.	Feb. 28, 1893.	Bassini. Kangaroo tendon; no drainage.	"	Primary union; sound, April, 1893.
36	Right oblique with undescended testis.	M.	15 yrs.	Size, egg.....	Congenital.	Yes.	March 3, 1893.	Bassini. Kangaroo tendon; no drainage; testis and epididymis separated; testis anchored in scrotum; wire frame.	"	Primary union.
37	Right oblique.....	F.	10 yrs.	Size of hen's egg.....	Congenital.	Yes.	March 6, 1893.	Bassini's operation as far as possible in female; kangaroo tendon; no drainage.	"	Primary union.
38	Right oblique, caecal.	M.	10 yrs.	Size, goose egg.....	Since 3 years to months old.	Yes.	March 24, '93.	Bassini. Kangaroo tendon; no drainage; appendix in sac and firmly adherent; adhesions separated and sac sutured.	"	Primary union.
39	Right oblique; inguinal.	M.	5 yrs.	Hen's egg.....	Since a few months old.	Yes.	March 31, '93.	Bassini. Kangaroo tendon..	"	Primary union.
40	Right femoral; incarcerated.	F.	14 yrs.	English walnut.....	3 years.	No.	April 4, 1893..	Purse string suture of canal, kangaroo tendon.	"	Primary union.
41	Double inguinal....	M.	13 yrs.	Egg; double recurrence from Czerny operation, 1890.	2½ yrs.	Yes.	April 11, 1893.	Bassini. Both sides; kangaroo tendon.	"	Primary union.
42	Right inguinal.....	M.	6 yrs.	Egg.....	3 yrs.	Yes.	April 18, 1893.	Bassini. Appendix removed.	"	Primary union.
43	Cæcal and appendix strangulated twenty four hours.	M.	7½ mos.	Egg.....	Congenital.	Yes.	May 18, 1893.	Bassini. Appendix removed.	"	Primary union.
44	Right femoral.....	M.	11 yrs.	Walnut.....	4 yrs.	Yes.	May, 1893.	Ligature sac; purse-string suture of canal. Bassini.	"	Primary union.
45	Cæcal and appendix strangulated	M.	4½ yrs.	Goose egg.....	Congenital.	Yes.	June 16, 1893.	Bassini.	"	Primary union.
46	Right inguinal.....	M.	8 weeks.	Large hen's egg.....	Congenital.	No.	June 16, 1892.	Child nearly moribund at time of operation; peritonitis already present.	"	Died on third day.
47	Right inguinal.....	M.	9 yrs.	Egg.....	Congenital.	Yes.	June 23, 1893.	Bassini. Kangaroo tendon..	"

* The kangaroo tendon in all cases was obtained from Dr. H. O. Marcy, of Boston, to whom great credit is due for bringing to notice the merits of this suture material.

danger is a real one, and that since we have other and better suture material, silk should be discarded in hernia operations.

The kangaroo tendon, or the ox-peritoneum, fulfils all the requirements for a buried suture in the hernial operation. They have no tendency to produce slow-healing sinuses, as is the case with silk, and to a less degree with silkworm-gut, and yet they remain unabsorbed for a period of three months or more, as shown by the recent experiments of Ballance and Edmunds,¹ a period sufficiently long to insure a thorough agglutination of the parts.

It has been claimed by the followers of Macewen and others that it is immaterial whether or not the suture is absorbed after ten days or two weeks, since sufficient union will have taken place at the end of that time. Clinical experience will not bear out this statement. Macewen's own brilliant results cannot be taken as evidence, since he used not only catgut of a large size but chromicized in addition, so that it probably remained unabsorbed for one or two months. Directly bearing on this point may be cited the recent experiments of Busse² on the suture of tendons in animals. His experiments prove that union of tendons seldom if ever occurs within ten weeks. The successful closure of the inguinal canal depends chiefly upon the more or less firm union secured between Poupart's ligament—a tendinous structure—on the one hand, and the tissues of the internal oblique muscle and conjoined tendon on the other. There is no evidence to show that such union occurs in the short space of ten days. On the contrary, there is much to prove that it does not.

Three years ago, at the Hospital for Ruptured and Crippled, sixteen children were operated upon with catgut sutures; six recurred within the first year, most of them shortly after the operation. I cannot but think that buried kangaroo sutures secure better approximation of several layers, and therefore a more permanent closure than the so called "crossed suture" advocated by Dr. G. R. Fowler, that has to be withdrawn at the end of five or six weeks. Another advantage is that the period required for the healing of the wound is shortened from three to four weeks, an important consideration with most patients.

Wound Treatment.—No drainage has been employed in any of my cases, and I believe it to be unnecessary.

In addition to the regular antiseptic dressings of iodoform and bichloride gauze, a plaster of Paris casing extending from the umbilicus to the foot is applied, and to

¹ Ballance and Edmunds: *Ligature of Arteries in Continuity*, 1892.

² O. Busse: *Deutsche Zeit. f. Chir.*, 1891-92, 31.

this fact is undoubtedly due, in a large measure, the uniform success in obtaining primary healing. The dressing is left undisturbed for eight days, at the end of which time the plaster is removed and only an ordinary muslin spica applied.

As fine catgut is used in closing the skin portion of the wound, the dressing does not have to be changed earlier to remove the stitches.

Final Results.—The cases have all been operated upon during the past eighteen months, it is therefore too early to estimate the number of permanent cures. All the cases have been kept under observation, and most of them recently seen. Two relapses have occurred, one following a Czerny operation, the other a Bassini. Both failures were early cases, and due to faulty technique and the use of silk suture, which caused suppuration. Both occurred within three months after operation. A Bassini operation was performed upon the case of relapse from the Czerny method, and the patient was recently seen, perfectly sound, one year later.

The Bassini method was adopted because no other method has given such brilliant and permanent results. Bassini's own cases, 251 in number, all but 4 of which were traced, showed but 7 relapses and no mortality; 108 were free from recurrence from one to four and a half years afterward, while 47 had passed the two-year limit.¹

The results of Championnière, Macewen, and Kocher, although exceedingly good, are inferior to Bassini's. Whatever method is adopted, I believe prompt primary wound-healing essential to success, and that all variations in technique that interfere with such healing should be abandoned. In proof of this, most of Halstead's 6 relapses (in 58 cases) failed to heal primarily, and the same is true of nearly all of Kocher's recurrences.

In addition to the 32 cases in children, I have operated upon 16 adults by the Bassini method. Of these 48 cases, but one relapse, already referred to, has taken place, and I obtained perfect primary union in 46 successive cases.

Limitations as to Age.—I believe that few cases other than strangulation require an operation under the age of four years. There are few under that age that cannot be controlled by a truss.

My 46 cases have been arranged in tabular form, and I shall not give them in detail. Several of them, however, are of sufficient importance to deserve special notice.

In 6 cases the hernia was of cæcal variety.

Two were the strangulated. Three occurred in children,

¹ A recent personal communication shows that Bassini has operated upon 560 cases, with no mortality and but 15 relapses.

aged four years, and one in a child of ten. All were very large, and it was absolutely impossible to control them with a truss. One case was complicated with spinal disease and incontinence of urine, yet primary union was obtained. In another, a long appendix was found adherent to the sac, almost to its tip. In one strangulated case the hernia was removed. In three cases adherent omentum, and in four reducible hydrocele of the sac existed.

A form of hernia rarely found in children, viz., femoral, occurred in two cases, one in a boy, aged seven. He had an old inguinal hernia on the opposite side. Both were operated upon the same day. In the femoral the sac was ligated high up and the opening closed with a purse-string suture of kangaroo tendon. The boy was up and about at the end of two and a half weeks. The case of strangulated hernia in the child, one year old, was of exceptional interest. The condition at the time of operation was very bad. The Bassini operation was quickly done under chloroform anæsthesia. The child reacted well, but the temperature steadily rose, and the following morning recorded 107° F., with a pulse of 150 to 160, and respiration 40 to 50. The abdomen was distended and tender, and the child was apparently nearly moribund. It was treated with half-hour tub-baths at a temperature of 100° F., cooled down to 95° F., and repeated when the temperature rose above 104° F., or about every two or three hours, for two days. After two days the child began to improve, and recovery was interrupted. In spite of the unfavorable conditions the wound healed by absolute primary union.

In three cases the hernia was complicated with undescended testis. The testis was brought down and anchored in the scrotum. A wire frame was made use of in two cases, and in a third the epididymis was dissected from the testis, thus increasing the length by nearly one inch. The result was very satisfactory as regards the hernia, but in two cases the testis retracted to the external ring.

The question of what is the best method of dealing with the undescended testis complicating hernia is still *sub judice*. There is some ground for believing that the majority of them are functionally of no value, and therefore one is warranted in removing them. We know that this is generally true as regards domestic animals, especially the horse, and Mr. Owens, of Glasgow, has demonstrated the same to be true in several cases in man. Châmpionnière in his 275 cases of hernia, operated upon 10 with undescended testis. In 5 he removed the organ, and in 5 he anchored it in the scrotum by Tuffier's method.

My object in presenting these cases has not been an attempt to prove the advisability of operating upon hernia in children in general, for I believe that most cases can be cured without operation, but rather an effort to show that there are certain cases in children that cannot be cured by mechanical means, and that the operation is practically devoid of risk, while at the same time it gives results superior to those in adults.

It should be remembered that these 46 cases operated upon have been selected from upward of 4,000 cases of hernia in children, and hence represent less than one per cent. of the entire number treated.

18 EAST THIRTY-SECOND STREET.

